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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/556,067

11/08/2005

Mitsuaki Komino

2005_1761A

6076

513 7590 02/19/2008

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EXAMINER

CHEN, KEATH T

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

02/19/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/556,067	Applicant(s) KOMINO ET AL.	
	Examiner Keath T. Chen	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 3-5,9 and 12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,6-8,10,11 and 13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/08/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Claims 3-5, 9, and 12 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 12/12/2007.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
2. Claims 1-2, 6-8, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umotoy et al. (US 20010054381, hereafter '381), in view of Nakamura et al. (US 4346285, hereafter '285).

'381 teaches the limitations of:

Claim 1: A semiconductor manufacturing device (Fig. 2a, cross section view of Fig. 1) comprising: a processing chamber (#250, [0033]); a supply passage

(showerhead #300, Fig. 1, [0032]) that supplies a processing gas to an inside of the processing chamber; a transferring passage (#260, slit valve, [0050], lines 7-11) through which a wafer is put in and taken out of the processing chamber; an exhaust passage (#600, exhaust assembly, [0030]) through which the processing gas inside the processing chamber is exhausted; and a sheet-like heating unit (heated liner #200 with embedded heater #215, [0034], lines 5-7) that in order to heat an inner wall face (inside of #250, [0033], lines 9-11) of the processing chamber, covers the inner wall face from an inner side ([0034], lines 5-7), and a resistive heating element (#215).

Claim 2: The semiconductor manufacturing device as set forth in claim 1, wherein the heating unit includes a heating main body (#200 is the main body) to be disposed adjacent to the inner wall face (inside of #250, [0033], lines 9-11), an attaching portion formed into a flange shape (Fig. 2b, #200 has a flange shape which attaches to the bottom through #220) or to extend integrally with the heating main body (flange is also an integral part of the main body), and a connector (AC connectors inside feed through portion #214, [0034] lines 11-13) that is provided at the attaching portion (which is annular, also close to #214) to draw out a wire (bottom right of Fig. 2a) for conducting electricity to the resistive heating element and a wire of a temperature sensor (#212, thermocouple, [0034] 2nd last sentence) that detects a temperature of the resistive heating element.

Claim 6: A heating unit (heated liner #200 with embedded heater #215, [0034], lines 5-7) of a semiconductor manufacturing device which heats an inner wall face (inside of #250, [0033], lines 9-11) of a processing chamber, comprising: a thin plate-

shaped resistive heating element (#200); cover like a sheet the inner wall face from an inner side, and define the processing chamber (#280 chamber cavity is defined by #200, [0049]).

Claim 7: The heating unit of a semiconductor manufacturing device as set forth in claim 6, wherein the heating unit includes a heating main body (#200) that is disposed adjacent to the inner wall face (inside of #250, [0033], lines 9-11), an attaching portion formed into a flange shape (Fig. 2b, #200 has a flange shape which attaches to the bottom through #220) or to extend integrally with the heating main body (also an integral part of the main body), and a connector (#214, feed through portion, [0034], last sentence) that is provided at the attaching portion so as to draw out a wire for conducting electricity to the resistive heating element and a wire of a temperature sensor (#212, thermocouple, [0034] 2nd last sentence) that detects a temperature of the resistive heating element.

Claim 13: The heating unit of a semiconductor manufacturing device as set forth in claim 7, wherein the heating unit is disposed by leaving a space ([0033], line 9-11) for insulating heat between the heating unit and the inner wall face.

'381 also teaches an embedded resistive heater #215, but is silent on the shape of the heater (probably mirror the shape of #200) and how it is embedded. '381 further recognized the difficulty to achieve uniform heating of the chamber walls ([0006]).

Therefore, '381 does not explicitly teach the limitations of:

Claim 1: (sheet like heating unit) sandwiches and covers a thin plate-shaped resistive heating element by a pair of metal plates.

Claim 6: a pair of metal plates that are formed to sandwich and cover the resistive heating element.

'285 is an analogous art in the field of heating device (field of the invention, which '381 lacks of details), particularly in achieve uniform heating (col. 2, lines 32-38, '381, [0006]). '285 teaches a thin plate resistive material (Fig. 5, #104a, col. 5, lines 17-22) sandwiched and covered by a pair of conductive plates (electrodes #104b and #104c, col. 5, lines 22-24, aluminum #101 and #102 is mentioned as a material connected to electrodes, Fig. 4, col. 5, lines 12-15, which is a suitable electrode material too).

At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to have combined '285 with '381. Specifically, to have adopted a heater made of thin plate-shaped resistive heating element sandwiched by a pair of metal electrode, as taught by '285, to replace the embedded heater #215 in the apparatus in Fig. 2a of '381.

The motivation would have been to improve the heating uniformity, as taught by '285 (col. 2, lines 32-38) and required by '381 ([0006]).

3. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over '381 and '285, in view of Steger et al. (US 5788799, hereafter '799).

'381 and '285, together, teach all limitations of claim 7, as discussed above.

'381 further teaches some limitations of claim 8:

The heating unit of a semiconductor manufacturing device as set forth in claim 7, wherein the heating unit includes a chamber heating unit that is disposed adjacent to the inner wall face of the processing chamber, and the chamber heating unit includes a cylindrical heating main body (#200 is cylindrical, [0033], line 9) to be disposed adjacent to a side wall face (inside of #250, [0033], lines 9-11) of the processing chamber and an attaching portion provided in a flange shape (Fig. 2b) at an end of the heating main body.

'381 and '285, together, do not teach the other limitations of claim 8:

A disk-shaped heating main body to be disposed to face a bottom wall face of the processing chamber and an attaching portion provided to extend on a lower face of the heating main body.

'799 is an analogous art in the field of CVD (field of the invention, '381, field of the invention), particularly in temperature controlled liner (col. 4, lines 11-13, '381, [0009]). '799 teaches the a lower temperature control liner (Fig. 2, #106, col. 7, lines 50-55, part of liner #102) at the bottom of the chamber, in addition to the upper liner (#104) at the side wall of the chamber .

At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to have combined '799 with '381 and '285. Specifically, to have adopted a heater at the bottom of the chamber, as taught by '799, to the apparatus of Fig. 2a of '381, while keeping an attaching portion like Fig. 2b of '381. This heater would have a disk-shape (despite a central hole, which has the same shape as the disk disclosed in Fig. 7 of instant application) and face a bottom wall face of the processing chamber.

The motivation would have been to slow deposit rate on the lower (or bottom) surface ('799, col. 8, line 18-24).

4. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over '381 and '285, in view of Iwabuchi (US 5755255, hereafter '255).

'381 and '285, together, teach all limitations of claim 7, as discussed above.

'381 and '285, together, do not teach the limitations of claim 10:

The heating unit of a semiconductor manufacturing device as set forth in claim 7, wherein the heating unit includes a transferring passage heating unit that is disposed adjacent to an inner wall face of the transferring passage, and the transferring passage heating unit includes a cylindrical heating main body having a roughly rectangular section and an attaching portion provided in a flange shape on the heating main body.

'255 is an analogous art in the field of semiconductor manufacturing (title), particularly in avoiding contamination of gate valve during operation (col. 2, lines 24-27).

'255 provides heating element (Fig. 7A, #243, col. 8, lines 24-28) in an inner wall face of the transferring passage (of gate valve) having cylindrical heating main body (as shown in Fig. 7D) and roughly rectangular section.

At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to have combined '255 with '381 and '285. Specifically, to have adopted the heating element of the gate valve, as taught by '255, to the apparatus of Fig. 2a of '381.

The motivation would have been to avoid contamination of gate valve during operation ('255, col. 2, lines 24-27).

5. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over '381 and '285, in view of Ohmi et al. (US 20030007917, hereafter '917).

'381 and '285, together, teach all limitations of claim 7, as discussed above.

'381 and '285, together, do not teach the limitations of claim 11:

The heating unit of a semiconductor manufacturing device as set forth in claim 7, wherein the heating unit includes an exhaust passage heating unit to be disposed adjacent to an inner wall face of the exhaust passage, and the exhaust passage heating unit includes a cylindrical heating main body and an attaching portion provided in a flange shape on the heating main body.

'917 is an analogous art in the field of CVD (field of the invention, '381, field of the invention), particularly in avoiding deposition to the processing equipment (exhaust piping, [0023]). '917 provides heating equipment to the exhaust gas passage of the process chamber ([0060]).

At the time the invention was made, it would have been obvious to a person having ordinary skill in the art to have combined '917 with '381 and '285. Specifically, to have adopted the heating of the exhaust passage, as taught by '917, to the apparatus of Fig. 2a of '381, while utilizing the nickel-plated aluminum liner with a flange (Fig. 2c) from '381 as the heating means at inner wall face of the exhaust passage. The heater would have conformed the shape of the exhaust as being cylindrical.

The motivation would have been to reduce deposition in the exhaust piping ('917, [0023]).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keath T. Chen whose telephone number is 571-270-1870. The examiner can normally be reached on M-F, 8:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. T. C./
Examiner, Art Unit 1792
/Rudy Zervigon/
Primary Examiner, Art Unit 1792